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PHARMACEUTICAL STILLS AND VAPOR CONDENSER.

By L. Wolff, M. D.

Read at the Pharmaceutical Meeting, October 21.

One of the most desirable features essential to the further advancement of pharmacy is that every pharmacist should at least make the most, if not all, of his galenical preparations and many of his chemicals. Why this is now so seldom done seems to depend upon the respective cost of production at our own laboratories and that of purchase from the various manufacturers. That the manufacturer by large purchases obtains a material reduction in the price of the raw material there is no doubt, but that the difference in price between a few pounds and a bale or barrel is not near that of the relative cost of production and purchase is also certain.

That the wholesale manufacturer's expenses are more than the pharmacist's, in proportion to the quantity produced, even admitting that the same care is exercised, and an equally reliable article made by them, is also without question. The liberal advertising done by the former to create a market for his goods, and the skilled labor employed by him, must all be paid from the margin on his wares, as it is obvious that no matter how large the quantity is, goods cannot be sold below the cost of production without loss, or below a certain limit if a standard of quality is to be observed.

The supply for crude drugs in limited quantities is facilitated, at the present day, to such an extent, that there is little excuse for any pharmacist to buy his fluid or solid extracts, providing that he has the necessary apparatus for recovering the menstruum or solvent employed. With proper means for doing so, no more than 10 per cent. of alcohol ought to be lost in their manufacture, and with that loss alone we cannot understand why a pharmacist should not more than compete with the wholesale manufacturer.

Take fluid extract of ergot, for instance, and employ the very best

Spanish ergot, at a cost of about 35 cents per pound (which is probably not always done by wholesale manufacturers), and grind it in an ordinary drug-mill, which is, or ought to be, in every drug store. The grinding, done at leisure hours by the available help, without extra expense, as well as passing through a suitable sieve, offers an advantage over the manufacturer. The menstruum of the reserve liquid, amounting to 85 per cent. of the final result, and consisting of 3 parts of alcohol and 4 of water, would cost only about 14 cents, and the evaporated remainder contain no alcohol. If the residual ergot of the percolator is mixed with water and expressed, and the alcohol in the expressed liquid recovered by distillation, the loss of alcohol would certainly be very small, and not amount to more than 10 cents per pound at the utmost. If the amount for ergot be set down at 35 cents, alcohol in extract at 14, loss at 10, and gas or oil for heating at 10, the cost of a reliable article can be computed at 69 cents per pound. What my *confrères* pay for it in the market I need not state here.

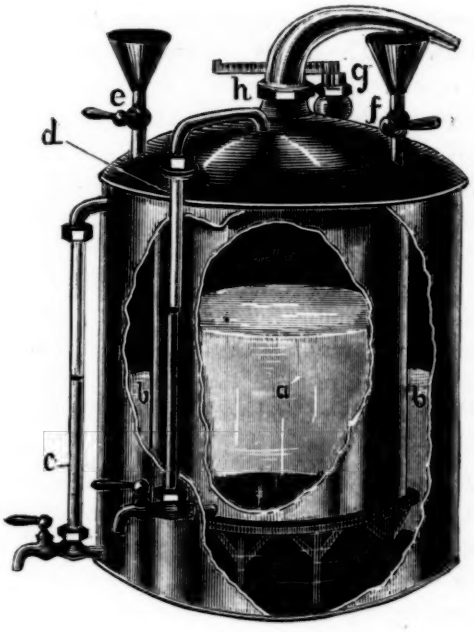
That the precipitated, purified aqueous extract of ergot, usually sold under the name of ergotin, can be made by every pharmacist, with recovery of the alcohol employed, at less than one-half of the lowest wholesale price now asked, I could demonstrate equally as well. Most, if not all, of the alcoholic and semi-alcoholic extracts can be prepared even in small quantities in the pharmaceutical laboratory with equal advantage and economy, as well as the new abstracts of the Pharmacopœia. The great desideratum which has always presented itself to me in the work of the laboratory has been that of a proper distilling apparatus.

The recovery of volatile solvents is an easy matter in laboratories with steam supply and properly jacketed stills and evaporating pans; but, without these, the alternative remains either to distil over the open fire, and thereby endanger the product, or, by placing a small still in hot or boiling water, conduct the process in a tedious and imperfect manner.

To overcome this defect and at once to have a distilling apparatus of suitable productiveness, which admits of distillation with or without pressure, I had constructed, of tinned copper and medium weight, the apparatus I here exhibit, which was made after a design executed by one of my assistants, Mr. J. Robert Moechel.

It will be seen by the cut, showing both the interior and exterior, that it is of cylindrical shape, about two feet in height, that it consists

of two cylinders, one inside of the other, and that both are attached to the convex top; the inner cylinder is mounted on a rest to prevent its weight from dragging down the common top. This inner cylinder contains the menstruum, *a*, to be distilled, or the alcohol to be recovered, which can be introduced at any time through the funnel, *f*. Attached to it from the top and reaching to its bottom is the gauge, *d*, through which the height of its contents, *a*, is seen. At the bottom of the gauge and connected with it is a faucet to draw the contents off at any time. The outer cylinder, which serves both as a joint steam and water-bath, contains water, *b*, connected with the water-gauge, *c*, which indicates the volume contained in it; a faucet attached to the lower end of it serves to draw off the



water as needed. Attached to the top of the outer cylinder is a steam valve, *g*, by which, if lifted, the steam may escape without pressure, or, if weighted, may be made to assume any desired pressure. The inner cylinder connects at *h*, by a screw-joint and gum packing, with a bent pipe, which in turn can be attached to a large copper Liebig's condenser, such as I here exhibit, or, instead, to one of Prof. Remington's condensers, if so desired.

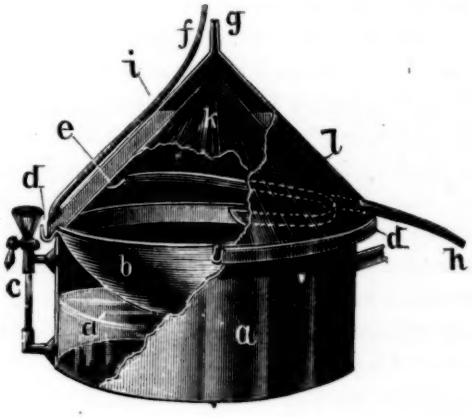
This apparatus is especially useful for recovering the alcohol from dilute menstrua and for concentrating alcohol largely diluted for purification, as well as for operating with solvents of larger volume, as in the manufacture of resin of podophyllum, berberine and hydrastine, apiol, etc. The solvent in these processes contained in the inner cylinder, and consisting of about five gallons of stronger alcohol, can be recovered in sufficient time to continue percolation with it, making the process almost continuous, and admitting of a twenty- or thirty-gallon exhaust to be effected with only about five gallons of menstruum above that absorbed by the substance to be exhausted.

One of the disadvantages of this apparatus is the difficulty of cleansing it after concentrating the liquid to be distilled to a certain degree, and therefore the impossibility of conducting the evaporation to the degree desired. The heating necessary to drive over the vapors, which can only be accomplished at the boiling point of the solvent, is in many cases, especially in aromatic extracts and those containing volatile oils or principles, a great disadvantage; while, if the evaporation is completed in some other flat vessel, considerable loss of the solvent is experienced—which, if alcohol, ether, chloroform, or carbon bisulphide are employed—interferes greatly with the cost of the product.

The most suitable apparatus for recovering all the solvent, and one admitting of rapid evaporation without loss to dryness of a solid, or the desired density of the residual evaporate of a fluid extract, is undoubtedly the "Hood Vapor Condenser," which has been in use for some time. It has several claimants for the credit of its origin, but I have not been able satisfactorily to attribute it to any one of them. It is one of the most useful, if not the most useful, solvent reclaimer of any in use in the pharmaceutical laboratory. Its principle of projecting hot vapor against a cooled slanting surface, from which the condensed liquid is recovered by a gully, is certainly not new, but its application offers advantages even beyond that principle. The vapor condensing in the hood over the evaporating dish, on being condensed, presents a vacuum which greatly facilitates evaporation, and lowers the boiling point of the liquid in it. I had for some time employed the hood condenser, simply fitted loosely on the evaporating dish, and with most excellent results in its operation, but found that with energetic ebullition the vapors would be forced out between dish and hood, occasioning, when ether, benzin, and carbon bisulphide were employed,

dangerous explosions; while in the evaporation of alcohol and chloroform the loss sustained was considerable. This caused me to adjust it in a manner which I will demonstrate in the apparatus here exhibited.

To a water-bath, *a*, containing water, *á*, fitted with a water-gauge, *c*, and faucet to admit turning off to keep the steam, or by turning on to let steam escape, or to add water as needed, and having proper handles to facilitate its removal, is fitted a tinned copper evaporating dish, *b*, as tightly as possible to prevent the escape of steam at the



sides. The evaporating dish has on its sides a groove, *d*, as a receptacle for a flange from the outside cone of the condensing hood. The hood itself is, like the rest of the apparatus, made of light weight tinned copper, and consists of two cones placed parallel within each other, about one inch apart. The two cones are closed squarely at the bottom, the outer, *l*, projecting and dipping down to form the flange for the water-joint to fit into the groove heretoforementioned. Running from the top on the outside of the outer cone is a supply pipe, *f*, for cold water, which enters into the space between the two at the bottom of the outside ones. From the top of the outer cone extends a pipe of the same diameter as the former to admit the escape of the water at *g*. The water for cooling is conducted to *f* by a rubber tube from a hydrant or reservoir, and allowed to flow off by a tube again into a sink or receptacle, or, as I have often done when sufficiently cool, into another similar apparatus for further condensing purposes. When in operation the vapors arising from the evaporating dish will be condensed on the

inner surface of the cone, *k*, and by its slant will run into the gulley, *e*, which is in turn placed slanting into the cone to allow the flowing off of the condensed liquid through the tube *h*. The water-joint, *d*, may be filled with water, but better, according to the solvent to be recovered, with oil or glycerin, and it makes the closure absolute and air-tight, without either the danger of escaping vapor and loss, or of explosion. The hood can easily be lifted to inspect the contents of the dish, or to replenish the same if necessary, doing away with the screws, flanges, and packing usually employed. To admit of proper operation of the water-joint, however, care must be had to make the escape-pipe, *h*, of the proper diameter, and give it sufficient dip to cause the condensed liquid to flow off readily, for with a small tube, as I had at first, and horizontally placed, I soon found that the filling of the pipe with liquid and the condensing of the vapor in the hood caused a vacuum which rapidly sucked up the liquid from the water-joint. Care must also be observed that the apparatus should be perfectly level; the liquid in the water-joint will give the best indication for that purpose.

An apparatus such as I have exhibited will answer all the purposes pointed out, both as an evaporator and a still. The heat necessary for its operation may be had either from a gas stove, or, where gas is not at hand, and even with greater economy, by a coal-oil stove, or may readily be operated by placing it on the top of an ordinary kitchen range or stove. There is absolutely no danger from explosion, and the recovered liquid, if highly inflammable, may be led away by a proper tube from any dangerous proximity of the flames. The fact that the evaporating dish is made of copper will not interfere with the evaporation of acid liquids, as these can be placed in porcelain dishes inside of it without interfering with the results.

The advantages of this apparatus are its simplicity and small expense, the rapidity with which evaporation is effected by it, its adaptability to any scale, the fact that in it evaporation may be conducted to the very end, and the ease with which residua may be removed and the apparatus itself be cleaned. Its work as a still is fully equal and greater than an ordinary one of its size, while it is perhaps the only apparatus by which vapor can be condensed at a comparatively low temperature and without boiling of the contents. For the manufacture of the fluid and solid extracts, oleoresins, abstracts, etc., on a small scale, I certainly know of no more suitable apparatus and one more adapted to the wants of the pharmacist. It might still further be improved

by the addition of a suitable thermometer, inserted through a cork in a proper opening in the hood, but I think for ordinary purposes it would be superfluous.

I offer the description of the above distilling apparatus, not with any special claim for originality or novelty, but simply as adaptations to the needs of the pharmaceutical laboratory; as such I have found them of great practical value, and if their employment aid to the desirable end of placing the pharmacist in his proper domain as a producer rather than a small dealer, the object of this paper will be fully attained.

THE ROOT OF PHYTOLACCA DECANDRA, LINNÉ.

BY EDMOND PRESTON, JR., PH.G.

From an Inaugural Essay.

No plant among us is more conspicuous in the fall than the poke for its large clusters of annual purple stems, covered at the top with ovate-oblong leaves, and bearing large pedunculated racemes of fine purple colored berries. A peculiar phenomenon was noted while observing Phytolacca at night in the fall, the leaves presenting a phosphorescent appearance in the dark. This peculiarity not being mentioned in any of the Dispensatories, a further search was made for a record of such a phenomenon in connection with this plant, and the following was found in Gmelin's Chemistry, vol. i, p. 188:

"Some plants emit in the dark a faint, continuous light, probably resulting from the formation of some substance which burns and emits light at ordinary temperatures, and consists, not of phosphorus, but more probably of a compound containing carbon and hydrogen. The leaves of Phytolacca decandra have been observed to shine in September from 9 till 12 o'clock at night, sometimes with blueish-green, sometimes with yellowish-green light, accordingly as the current of air was stronger or weaker; they also remained luminous after being wiped."

The large perennial root, in some specimens from 8 to 10 inches in diameter, has an expanded crown where the numerous stems are joined. This thick part of the root grows perpendicularly to the depth of 12 to 18 inches, where it divides into from two to four nearly equal branches, which extend horizontally, in different directions, from 6

to 10 feet, from the main root, and gradually taper in size. These main branches seldom divide again, but irregularly send off smaller ones.

Estimation of Moisture.—100 gm. of the fresh root, sliced in thin pieces, was allowed to dry in the air to the condition as it is found in commerce, losing thereby 72·84 gm. On continued exposure in a drying chamber until it ceased to lose weight a loss of 7·889 gm. was noted, showing a total of 80·729 per cent. of moisture and 29·046 per cent. in the air-dried or commercial root.

Ash.—10 gm. of the powdered (air-dry ?) root yielded an ash weighing ·84 gm., equal to 8·4 per cent. Of this ash ·68 gm. was soluble in water, ·16 gm. insoluble. Potassium was found to be the principal base in the soluble portion, by precipitating it with saturated solution of bitartarate of sodium; it equals nearly 5·5 per cent. KOH of the powdered root. The large amount of potassium salts found in this drug is noticeable. A little sulphuric and hydrochloric acid, besides carbonate, was found in this portion. The ash insoluble in water yielded to hydrochloric acid a little calcium and iron, and left silica behind.

In the following experiments the fresh root was used. The experiments of Donnelly ("Am. Jour. Phar.," Oct., 1843, p. 165) and W. F. Pape (*Ibid.*, Dec., 1881, p. 597) were verified in so far as to the finding of starch, tannin, gum, sugar, resin, fixed oil and lignin. In view of the rapid deterioration of Phytolacca root on keeping, and the probability of its containing an alkaloid, as pointed out by W. F. Pape, the first experiments made were in search of a volatile alkaloid.

A strong tincture of the root, prepared with diluted alcohol, and made alkaline with solution of potassa, was distilled in a glass retort, and the distillate, having a strong, disagreeable odor of the root, was caught in distilled water slightly acidulated with sulphuric acid. After concentration, the tests for alkaloids were applied, with negative results.

A portion of the root was finely broken up and macerated in cold water for 24 hours, then the whole introduced into a retort and distilled in a salt water bath. The distillate had the characteristic odor and acrid taste of the root, and a strong acid reaction. The acid distillate was set aside and the contents of the retort divided into three portions. With the first distillation was continued as before, but no change took place in the distillate. The second and third portions

were distilled separately after the addition of solution of potassa and sulphuric acid to each respectively, and still no change could be noted in the distillate.

The first acid distillate was then carefully neutralized with solution of potassa. A change of color was here noted as the liquid neared neutrality, the colorless liquid changing to a pale light yellowish-green, and at the same time the odor almost entirely disappeared. The solution was slowly and carefully evaporated to a small bulk, and, on allowing to stand, a small crop of nearly colorless acicular crystals separated. These had an acrid taste, resembling that of the root, after remaining in the mouth a short time. On being treated with acids the salt was decomposed, the acid going off with effervescence, and giving the characteristic strong disagreeable odor of the root in an intensified degree. The crystals I consider to be the potassium salt of a volatile acid characteristic of Phytolacca root.

A strong decoction of the root was precipitated with solution of subacetate of lead, filtered, and the lead precipitated from the filtrate by a current of hydrosulphuric acid gas; again filtered, and a portion evaporated to a small bulk. This was divided into four parts, and tested for alkaloids with phosphomolybdic acid, tannin, iodohydrargyrate of potassium and auric chloride; each gave a precipitate indicating the presence of an alkaloid, to separate which the following method was used:

The filtrate from the lead precipitate was carefully concentrated and mixed with an equal volume of saturated alum solution. The mixture was heated, ammonia added in slight excess, the whole evaporated on a water-bath, and the residue powdered and extracted with alcohol. On evaporating the alcoholic liquid a yellowish mass of small crystals was obtained. This was redissolved in alcohol, the solution passed through animal charcoal and carefully evaporated, when small, nearly white crystals were left. These were quite soluble in alcohol, moderately so in water and nearly insoluble in ether and chloroform. They were entirely dissipated when heated upon platinum foil, and in aqueous solution gave precipitates with the four alkaloidal reagents before mentioned. With strong nitric, sulphuric or hydrochloric acids the crystals simply dissolved, giving no characteristic color test.

The alcoholic solution of the crystals, neutralized with diluted hydrochloric acid, on concentration yielded nearly colorless acicular

crystals, which were moderately soluble in alcohol, quite soluble in water, and possessed a strong acrid taste.

From these results I conclude that the crystals were those of an alkaloid contained in Phytolacca root and of the hydrochlorate of the same, for which I propose the name of *Phytolaccine.*

LABORATORY NOTES.

ABSTRACTS FROM THESES.

Cantharides.—Emlen Martin determined the amount of cantharidin obtainable from commercial cantharides and powdered cantharides by the method of Procter and Mortreux (chloroform and carbon bisulphide). One specimen in which the soft parts had been destroyed by mites yielded no cantharidin; a second specimen probably old, left an uncrystallized wax-like substance not further examined; a third specimen attacked by mites, gave ·38 per cent. of cantharidin. Five specimens of the powder yielded respectively ·25, ·30, ·48, ·49 and 1·06 per cent. of cantharidin; the sample yielding the largest amount, being destitute of green lustrous particles, was most likely made from Chinese blistering beetles.

Distilled Water of Wild Cherry Leaves.—George E. Spangler collected the leaves of Prunus serotina in the latter part of June, 1883. After macerating 12½ troyounces of the well bruised leaves with 4½ pints of water, 18 fluidounces were distilled over, the distillate containing hydrocyanic acid. The leaves collected in July yielded a stronger distillate. It is thought that if the quantity of distillate was made equal in weight to the leaves, the strength of the water would amount to 0·1 per cent. HCy.

Spigelia.—William C. Boynton, on examining true pinkroot obtained the following results: Moisture 8·621, benzol extract (resin, wax and fat) ·518, alcohol extract (resin, tannin, extractive) 7·418, and water extract (gum, tannin, extractive) 11·008 per cent.; with diluted alcohol 18·64 per cent. of extract were obtained.

Phlox Carolina contained 9·5 per cent. of moisture and yielded with diluted alcohol 17·57 per cent. of extract. The ash is stated to have amounted to 18·8 per cent., and for spigelia to 20·5 per cent.; a quantitative determination of its constituents was not made.

Stigmata Maydis have been examined by John M. Hillan. He found fresh corn silk to contain 83·3 per cent. of moisture, and the well dried drug to reabsorb water from the atmosphere quite readily. Dry corn silk yielded 12·5 per cent. of ash containing carbonates, chlorides, phosphates and sulphates of potassium, magnesium and calcium, alumina and silica. Benzol extracted 2 per cent., the extract having a brown color and containing fixed oil and resin. Alcohol of 80 per cent. yielded 26·05 per cent. of extract, containing tannin and chlorophyll, and water subsequently dissolved 2·25 per cent. of extractive. Sugar was found in green, but not in dried corn silk. Distillation with water did not yield a volatile oil; on distilling with potassa, an alkaline liquid was obtained, which on being evaporated with acetic acid yielded crystals, and the solution of which was precipitated by iodine and by Mayer's solution.

Fluid Extract of Corn Silk.—J. M. Hillan prepared a fluid extract by M. Kennedy's formula ("Amer. Jour. Phar.," 1883, p. 243), and found it to occasion a precipitate. Made from the dried corn silk by the same process, the preparation was permanent; but the author recommends to increase the glycerin, using for 100 Gm. of dry corn silk 25 Gm. of glycerin and sufficient diluted alcohol to obtain 100 Ccm. of fluid extract.

C. H. Oberholtzer observed that the fluid extract prepared by Mr. Kennedy's formula would ferment (?) and recommends as a menstruum a mixture composed of two parts of alcohol and three parts of water, using 100 Gm. of green corn silk for obtaining 100 Ccm. of fluid extract.

Syrup of Corn Silk.—J. M. Hillan recommends dissipating the alcohol by mixing 12 parts of the fluid extract with 65 parts of sugar, and after the alcohol has evaporated, adding 5 parts of glycerin and sufficient water to make 100 parts.

C. H. Oberholtzer recommends mixing 35 parts of his fluid extract with 65 parts of simple syrup.

Syrupus Myrrhæ.—Abraham L. Ballinger examined several specimens of myrrh and powdered myrrh, and offers the following formula for a syrup:

Take of Tincture of myrrh	℥ij
Magnesium carbonate	℥i
Sugar	℥xij
Water	sufficient.

Rub the tincture with the magnesium carbonate, afterward with

8 ounces of water, filter and dissolve in the filtrate the sugar. The syrup should measure 16 fluidounces. It has an agreeable flavor, makes a good vehicle for administering nauseous medicines, and can be made to take the place of syrup of tolu.

Phosphoric Acid.—Harry Lovett Miller, Jr., examined four samples of commercial phosphoric acid and found these to respond to the pharmacopœial tests for purity, except that two samples contained slight traces of phosphorous acid, and one sample was contaminated with arsenic, which, estimated as $Mg_2As_2O_7$ was found to be ·031 per cent. As_2O_3. The specific gravities ranged between 1·229 and 1·347, and on evaporating 5 Gm. of the acid with 10 Gm. PbO and igniting, the residues weighed respectively 11·29, 11·57, 11·60 and 11·66 Gm.; the Pharmacopœia requires 11·81 Gm.

Magnesium Carbonate.—Frank Gibbs Ryan has assayed six samples of this salt prepared by different manufacturers. On boiling with 20 times their weight of water, filtering and evaporating, residues were left weighing ·18, ·26, ·28, ·40, ·44 and 48 per cent. Magnesium oxide was estimated merely by ignition, carbon dioxide by hydrochloric acid in a Geissler's apparatus, and water by the difference. The results compared with the theoretical amounts according to the formula recognized by the United States Pharmacopœia are as follows:

	U. S. P.	Samples	1	2	3	4	5	6
MgO	41·32		41·85	44·65	43·25	43·45	41·00	41·30
CO_2	36·36		34·90	34·05	33·75	32·45	31.85	31·80
H_2O	22·32		23·25	21·30	23·00	24·10	27·15	26·90

Granulated Magnesium Citrate.—James A. Pool examined three commercial specimens, and determined the percentage of

Magnesium carbonate,	3·9	1·0	3·2
SO_3	4·3	1·0	0·7
CO_2	12·5	7·5	10·5

In addition to these, sodium, potassium and citric acid was found, and neutral solutions of each specimen on being boiled with silver nitrate, yielded a metallic mirror, which was regarded as evidence for the presence of tartaric acid.

Blaud's Pills.—John A. Murtaugh obtains a satisfactory pill mass by using exsiccated ferrous sulphate, and well-dried potassium carbonate, forming the mass with powdered liquorice root and honey (See "Amer. Jour. Phar." 1883, p, 141). But compression is preferred, ¼ grain of acacia

or of sugar being added for each pill to the mixture of dried salts, to render the powder sufficiently adhesive. As a still better method for preserving these pills it is suggested to introduce into the mould about ½ grain of powdered sugar, then the pill, cover with ½ grain of sugar and compress.

GLEANINGS FROM SCANDINAVIAN JOURNALS.

By Hans M. Wilder.

The *poison law in Denmark*, as far as it relates to morphine and opium, has been (July 20, 1883) remodeled as follows:

1. Prescriptions (whether for external or internal use) containing morphine, its salts or any other alkaloid of opium, *must not be repeated*, and it is made obligatory to cancel the prescription with a stamp, covering (but not making illegible) the writing.

2. Prescriptions (whether for external or internal use) containing opium and its (officinal or unofficinal) preparations *must not be repeated* when the single dose amounts to 5 centigrams or over of opium, or when the total amount prescribed amounts to more than 1 gram. These, also, must be cancelled as above stated.

3. Whenever a prescription ought to be cancelled and repetition prevented, because the total amount is more than 1 gram opium, it is *not allowed* to give a fractional part (half, quarter, etc.), so as to enable the repetition of said prescription.—*Arch. for Pharm.*, 1884, p. 94.

A Swedish apothecary bought a seroon of Calisaya cinchona from Jobst, in Stuttgart, which was quoted in his price-current as "allerschönst, electissima," and at a considerably higher price. No quinine was found in the bark, and, on remonstrating, Jobst stated that for the last ten years flat calisaya contained very little quinine, scarcely one-third of the 2½ per cent. cinchona alkaloids generally present.—*Farm. Tidskrift*, 1883, p. 321.

Filix mas.—The rhizome of Polystichum Filix mas, *Roth*, has been found contaminated with admixture of the rhizomes of Asplenium Filix femina, *Bernh.*, Polystichum spindulosum, *D. C.*, and Polystichum dilatatum, *Hoffm.*—*Farm. Tidskrift*, 1883, p. 129.

Kamala.—Liljenström has found the following per cent. of ash: 4, 10, 17, 33, 35, 40, 45, 49. Two samples of Lupulin were found

to have, respectively, 24 and 26 per cent. of ash.—*Farm. Tidskrift*, 1883, p. 151.

A letter from a Swedish pharmacist in the United States concludes with the advice that "drunkards had better stay at home."

A correspondent of "Farmaceutisk Tidskrift," 1883, p. 348 (Sweden), complains of a custom, not entirely unknown here in the United States, of physicians prescribing unofficinal galenical preparations (mixtures, etc.) by the name of the originator; such a prescription cannot be understood by every pharmacist. The preparation in question was liquor (solutio) aluminæ acetatis, which—originating with Burow—is often prescribed as "Solutio Burowi."

Test for Free Mineral Acids in Vinegar and Wines.—J. G. Bergman takes advantage of the fact that oxalate of calcium is insoluble in acetic and tartaric acids, but soluble in mineral acids. Take 5 cc. of the liquid to be examined, and 5 drops test-solution of oxalate of ammonium, and then 10 drops test-solution of sulphate of calcium. (The addition of the lime solution is not necessary with wines, which generally contain sufficient lime.) In the absence of free mineral acids, a precipitate of oxalate of calcium will occur (either at once or after awhile); if, however, mineral acids be present, the liquid will remain clear. After repeated experiments it was found that as little as one-half of 1 per cent. of free sulphuric, nitric and muriatic acids could be detected.—*Farm. Tidskrift*, 1883, p. 251.

Absorbent Cotton.—E. Poulsson modifies Slocum's process (see "Am. Jour. Phar.," 1881, p. 53) as follows: 1 kilogram cotton is boiled for half an hour in 4 litres water, containing 25 grams caustic potassa, and then well washed till every trace of alkali has been removed. It is squeezed quite dry and put for 15 to 20 minutes in a 5 per cent. solution of chlorinated lime. After washing with a little water (not too much) the cotton is dipped into water acidulated with muriatic acid (about 30 grams diluted muriatic acid to 4 liters water), rinsed in fresh water, and boiled again in alkaline water of the above mentioned strength. After washing, it is dipped into the acid solution and rinsed perfectly. Let dry.—*Farm. Tidskrift*, 1884, p. 22.

Codeine Jelly.—Dr. G. S. Mahomed draws attention to a preparation in the form of jelly containing codeine, citric acid, tolu, and glycerin, which he found a pleasant and serviceable agent in the treatment of chronic laryngitis, phthisical cough, etc.—*Brit. Med. Jour.*

THE HOMOQUININE OF CUPREA BARK.

By B. H. Paul and A. J. Cownley.

The very important contribution to the chemical history of the remarkable substance occurring in cuprea bark, which has been furnished by Dr. Hesse in the paper published in the "Annalen" for July last,[1] well entitles him to the gratitude of those who first recognized its individuality, and as among that number, we desire to express our sense of obligation to him for the use he has made of his superior opportunities for investigating this subject. Certainly the substance in question is deserving of some consideration, for in addition to its own peculiarities, and the fact that it was independently and simultaneously discovered by four distinct sets of observers, it has been subjected more than the common run of "new bodies" to the struggle for existence, which is perhaps the best test of fitness. In the first place, Dr. Hesse is responsible, perhaps, for the non-publication of the observation made by his colleague Mr. Tod, in June, 1881, that cuprea bark contained a hitherto unknown alkaloid, and he was certainly disposed to doubt the distinct nature of the crystalline substance we obtained from that bark until we placed a small specimen of it in his hands for examination. Dr. Kerner and Dr. De Vrij pronounced the crystals of homoquinine sent to one of them by Mr. David Howard to be a mixture of quinine and cinchonidine, and lastly, Messrs. C. H. Wood and Barrett illustrated the dangers attending the use of the imagination in scientific matters by putting forward a suggestion implying that the substance, which indeed, Dr. Hesse infers, they do not seem ever to have seen, might be a compound of quinine with quinidine. Nevertheless, homoquinine has survived, though the difficulty of obtaining a supply of material for investigation has hitherto been a serious obstacle with those who would otherwise have studied it more completely.

Dr. Hesse has long since recognized the fact that cuprea bark contains a peculiar crystallizable alkaloid,[2] and he has now, in the most practical manner, made amends for his former disbelief by giving an elaborate history of this substance and its compounds, which places it beyond question. At the same time, however, we regret to find he has done this with some degree of hankering after the opinion he first

[1] A translation of this paper appeared in the "Pharmaceutical Journal" for August 23, p. 141, and was reprinted in "Amer. Jour. Phar.," Oct., p. 515.

[2] "Berichte," xvi, 60, and "Pharm. Journ." Feb., 1883, p. 685.

expressed and that he suggests, as it were, as an apology for having confirmed the existence of homoquinine, the possibility of quinine becoming "modified" under certain conditions and then behaving as a distinct alkaloid.[1]

We had long been aware that, in operating upon homoquinine with a view to its purification and the preparation of salts, there was sometimes an apparent disappearance of the substance, as it were, under one's hands, in a way that was unaccountable, and that then the presence of quinine, or of an alkaloid resembling it in solubility in ether, could be recognized in the solutions; but we had always ascribed this latter circumstance to the admixture of quinine with our material and the small quantity of that at our disposal prevented the further settlement of this point. Another circumstance, which at first seems slight, seems to lend considerable probability to Dr. Hesse's statement as to the convertibility of homoquinine into quinine, was the failure of all attempts to detect that substance in commercial quinine sulphate manufactured from cuprea bark. With a view to obtain a workable quantity of homoquinine we have repeatedly examined samples of quinine sulphate which we had every reason to believe had been derived from cuprea bark, and within the last few weeks have taken advantage of an opportunity to repeat the attempt with material of this description; but in every instance we have failed to obtain the faintest indication of the presence of homoquinine. But with every respect for the trustworthy nature of Dr. Hesse's observations, so far as they go, we must confess that our own experience in dealing with this remarkable substance made us hesitate before accepting unreservedly the statement that it is a modification of quinine and capable of being converted into quinine by the action of caustic soda. Upon receipt of Dr. Hesse's paper, therefore, we at once proceeded to follow out the treatment he describes for effecting the conversion of homoquinine into quinine. A quantity of the crystalline substance, obtained by treating the crude sulphate from cuprea bark with ammonia and ether, was first recrystallized several times from ether in order to separate any adherent quinine, and an acid solution of the purified substance was mixed with a 10 per cent. solution of caustic soda in excess and some ether. The alkaloid at first precipitated was completely dissolved on agitation, the ether solution, as well as the alkaline liquor becoming perfectly clear. After the lapse of several hours there was, however, no separation of

[1] See October No., p. 524.

crystals from the ether solution, as would have been the case with even a very dilute solution of ammonia had been used in place of caustic soda. Upon separating the ethereal liquor, neutralizing the alkaloid contained in it with sulphuric acid and evaporating, a crystalline sulphate was obtained, which when tested in the usual way with ether and ammonia behaved exactly like quinine sulphate, no vestige of homoquinine crystals being formed even after the lapse of several days. This result appeared to be exactly the same as that obtained by Dr. Hesse, except in one particular, viz., that it was not obtained by degrees, as Dr. Hesse's description would suggest, but at once and without any need for the "repeated precipitations" mentioned by Dr. Hesse. This discrepancy led us to repeat the experiment several times, invariably, however, with the same result, which seemed to be conclusively opposed to the doubt we entertained as to the conversion of homoquinine into quinine. But on further consideration of the matter and having, as is our general practice, regard to the quantitative relations of the experiment, we observed that the quantity of alkaloid permanently soluble in ether thus obtained was never more than about one-half that of the homoquinine operated upon. The solubility of quinine in solution of caustic soda is too slight to account for this deficiency. Still we found that on adding to the caustic soda liquor with which the homoquinine had been treated in these experiments, sufficient sulphuric acid to make it faintly acid, there was a copious precipitation of a crystalline sulphate, the quantity of which accounted for the deficiency above mentioned. The alkaloid contained in this salt was not quinine; it crystallized readily from solution in ether in rhombic plates, larger and more massive than the ordinary crystals of homoquinine and otherwise presenting a character distinctly different from them. The alkaloid thus obtained was again treated with caustic soda solution and ether, but it gave no evidence of being thus convertible into quinine; the whole of it remained dissolved in the soda solution and was easily obtained again in the crystalline state by subsequent treatment in the ordinary way with ether and ammonia. Heating this base with caustic soda solution also failed to render it permanently soluble in ether or to affect its capability of crystallizing from ethereal solutions. On re-examination of the caustic soda liquors separated in the various repetitions of this experiment we found that after having been exposed some time and undergone evaporation they presented the appearance of

a thick jelly, another point which marks the alkaloid soluble in caustic soda solution as peculiar and one hitherto unobserved.

At present we are not in a position, from dearth of material, to carry our examination of this subject further, but the results above described are, we think, sufficiently definite to justify our dissent from Dr. Hesse's statement that homoquinine is a modification of quinine and that it is completely convertible into quinine. The more precise interpretation of these results must be left until we are able to obtain a more adequate supply of material than the two or three grains of homoquinine crystals we have operated upon hitherto. It may, however, be suggested that these results, taken together with those by which Dr. Hesse has proved the individuality of homoquinine, furnish evidence that this latter alkaloid is susceptible of being split into two other alkaloids, one of them being either quinine or a base closely resembling it, the other an alkaloid not hitherto observed, to which we will provisionally give the name of "cupreine." Our results also explain why homoquinine is not found in the commercial quinine sulphate made from cuprea bark.—*Phar. Jour. and Trans.*, Sept. 20, 1884.

Antipyrine is the name given by Dr. Knorr of Munich to an alkaloid, prepared by him synthetically from coal tar. It contains oxygen, appears in commerce in the form of a white crystalline powder, somewhat resembling salicylic acid in appearance, is inodorous and nearly tasteless, and is freely soluble in water; it combines with acids, forming salts from which alkalies liberate the base. Antipyrine is colored intensely red by ferric chloride and other oxidizing agents, the effect being produced even by dust containing iron, which causes red spots upon the crystalline powder; it requires therefore to be kept in well closed bottles, which should also be protected from the light, since long continued exposure to light causes likewise a red tinge.

The alkaloid has been found, by Prof. Filehne of Erlangen and by other physicians, to be an excellent remedy in high fevers for lessening the temperature 2° or 3° C. without producing other unpleasant effects and mostly without sudorific action; from 3 to 5 Gm. are required for this purpose, and are divided into three does, to be given in intervals of one hour, previously dissolved in water or wine. The dose of antipyrine may be stated to be 1 to 2 Gm. for adults, and 0·5 to 1 Gm. for children.

BARK OF "BOIS PIQUANT."

By E. Heckel and F. Schlagdenhauffen.

The bark examined was the variety peculiar to Guiana, and agreed exactly with Guibout's description of *Zanthoxylum caribæum*. Its anatomical structure is entirely different from that of angustura bark, which it resembles in external appearance. When macerated with water, it yields a bitter, slightly acid, yellow solution, which turns brown with ferric chloride, and yields an abundant yellow precipitate with mercuric chloride, stannous chloride, tannin, picric acid, double iodides, or phosphomolybdic acid, but gives only a slight turbidity with lead acetate. Nitric acid produces a deep red color. When extracted with light petroleum, the bark yields a considerable quantity of chlorophyll, fat, and wax, together with a crystalline substance which can also be extracted by alcohol. This substance forms colorless needles of the composition $C_{12}H_{24}O$, which melt at 285°, and gives no coloration with nitric, sulphuric, or hydrochloric acid.

If the alcoholic extract, after separation of these crystals, is diluted with water, mixed with lime, evaporated to dryness, and the residue extracted with boiling alcohol, a second crystalline substance is obtained which resembles the vegetable alkaloids in its general properties. It exists in the bark only in very small quantities. With nitric acid, it gives a deep-red coloration, but if the liquid is evaporated on a water-bath and mixed with stannous chloride, no violet color is produced. Sulphuric and hydrochloric acid have no action on it, but sulphuric acid and potassium dichromate, manganese dioxide, or lead dioxide, produce a violet coloration similar to that produced by strychnine mixed with a little selenium. An alcoholic solution of bromine also produces a deep blue coloration which persists for a long time. Five mgrms. of this alkaloid injected in aqueous solution beneath the skin of a frog, produce rapid general paralysis, followed by death in about half an hour, and similar effects are observed with rabbits and guinea-pigs.

A nitrogenous resinous substance, soluble in water, was also obtained from the bark. It has the general properties of the alkaloids, and in its physiological action very closely resembles the crystalline alkaloid just described, although it differs from it in physical properties. None of the so-called xanthopicrite could be obtained from the bark.—*Compt. rend.*, 98, 996–998; *Jour. Chem. Soc.*, August, 1884, p. 848.

A GLUCOSIDE FROM BOLDOA FRAGRANS.

By P. Chapoteaut.

The leaves of *Boldoa fragrans* are treated with boiling alcohol, the solution evaporated to dryness, and the residue extracted with very dilute hydrochloric acid in order to remove the alkaloid described by Bourgoin and Verne. The liquid, freed from the greater part of the mucilaginous matter, is then treated with ether or chloroform, and this ethereal or chloroform solution, on evaporation, leaves a transparent amber-colored syrup with an aromatic taste and smell. This substance, which exists in the leaves to the extent of 0·3 per cent., has the composition $C_{30}H_{52}O_8$, and can be distilled in a current of steam, but cannot be distilled without decomposition in a vacuum or in a current of hydrogen. When heated with very dilute hydrochloric acid, it yields glucose, methyl chloride, and a syrupy substance of the composition $C_{19}H_{28}O_3$, which dissolves in alcohol and benzene, but is insoluble in water. If the benzene solution is treated with sodium, hydrogen is evolved; and if the sodium-derivative thus formed is treated with alcoholic iodides, methyl or ethyl-derivatives can be obtained. The substance, $C_{30}H_{52}O_8$, is therefore a glucoside or, rather, an ether in which glucose plays the part of an acid. The constitution of the alcoholic constituent has not yet been ascertained.

When the glucoside is injected under the skin of a guinea-pig, or taken into the stomach of a dog, it produces a quiet sleep of longer or shorter duration. If injected into the blood of the dog, it excites and increases the secretory functions, especially the secretion and excretion of bile, saliva, and urine.—*Compt. rend.*, vol. 98, p. 1052–1053; *Jour. Chem. Soc.*, August, 1884, p. 845.

Tin in Preserved Food.—E. Unger (*Dingl. polyt. J.*, 251, p 192) found that asparagus preserved in tinned boxes contained 0·019 to 0·033 per cent. tin near the sides, and from 0·021 to 0·033 per cent. in the centre of the boxes. The tin was present in the form of a proto-salt. The acid juice of pressed apricots and strawberries was found to be free from tin, whilst the fruit contained this metal; apricots gave 0·0185 per cent. tin, and strawberries 0·0175 per cent.—*Jour. Chem. Soc.*

CHEMISTRY OF PLANTS.

By M. Ballo.

The author previously showed that in aqueous solution of carbonic anhydride, the latter exists as hydroxide, and he concludes therefore that this is the form in which it becomes assimilated by plants. He finds that the reduction of carbonic anhydride to formic acid can be effected not only by the action of potassium on the moist gas, but also by the action of an energetic reducing agent (sodium-amalgam) on alkaline hydrogen carbonates, and on calcium hydrogen carbonates, this being of interest in connection with plant chemistry through the wide distribution of the later salt in water. Glycollic acid, which has been shown to occur in unripe grapes, and also tartaric acid have been obtained by the reduction of oxalic acid (*Bull. Soc. Chim.*, vol. 27, p. 3; *Annalen*, vol. 166, p. 124). Tartaric acid has likewise been shown by Liebig and others to be an oxidation-product of most of the carbohydrates, and by reversing the process (*i. e.*, by reduction) it might therefore be better suited to the formation of these substances than carbonic acid. Whilst a portion of the oxalic acid of plants serves to decompose calcium sulphate, by far the greater portion must give rise to the production of glycollic and tartaric, or of malic and succinic acids. The conversion of formic acid (which is assumed to be the first reduction-product of carbonic acid) into oxalic acid in plants, is probably brought about by nitric acid; it is found that nitric acid does effect this conversion if the reaction be stopped when red fumes begin to be evolved. The author believes that this is the reason why nitrogen must be presented to plants in the form of nitrates; a portion of this is no doubt reduced to ammonia, a second portion probably to nitrous acid, whilst the greater part is reduced to nitric oxide, which, by the action of oxygen and water, becomes reconverted into nitric acid.

The reduction of oxalic to tartaric acid may be assumed to be effected by the coalition of two oxalic acid molecules, or of one molecule oxalic acid with one molecule glycollic acid; whilst the production of acids containing an uneven number of CH.OH-groups can be explained by formic acid taking part in the reaction. By the further reduction of the acids, alcohols are produced. It is not yet understood in what way the salts act in the vegetable and animal organisms, but

the author thinks it possible that they assist in bringing about the formation of the more complicated products.

By the action of sodium on an ethereal solution of chlorhydrin, a hexyl alcohol, $C_6H_{10}(OH)_4$ (*glycerythrol*), is obtained, homologous with erythrol. It is soluble in water and alcohol, insoluble in ether, and forms a thick yellowish syrup of bitter taste.—*Ber.*, vol. 17, p. 6—12, and *Jour. Chem. Soc.*, p. 765, July, 1884.

ON IODINE IN COD LIVER OIL AND OTHER MARINE PRODUCTS.

By Edward C. C. Stanford, F.C.S.

In a paper on this subject read before the Pharmaceutical Conference at Southport, last year, I found the proportion of iodine in cod liver oil to be much less than the results published by other observers. (See "Amer. Jour. Phar.," 1883, p. 612)

Taking the average of six samples from different sources, I found them to vary from ·000138 per cent. to ·000434 per cent., the average being ·000322 per cent. The amount contained in the fresh liver was more than twice as much, ·000817 per cent. Since then I have had the opportunity of examining two genuine samples, of which I know the origin, with the liver from which these have been extracted; one was sent me by Mr. Gale, of Messrs. J. Bell & Co., and the other was made by myself. I obtained 14 ounces of oil and a little water from 2½ lbs. of liver. All were examined for iodine with the following results:

	Per cent.
Cod liver oil, Gale, filtered	·000040
" " " " unfiltered	·000052
" " " " marc	·000200
" " " Stanford	·000077
" " " " marc	·000765
" " " " water	·000680

I think, therefore, from the analyses of these oils of known origin, we are justified in the conclusion that iodine has little to do with the therapeutic value of the oil.

Oysters.—It is commonly supposed that these delicious esculents are

rich in iodine. The Anglo-Portuguese variety has been specially reported on. These oysters are obtained from about thirty miles of coast extending from Lisbon to Cacillias Point, and are nursed and fattened in England.

Dr. Champouillon, of Paris, published a report on these oysters in 1876, from which the following is an extract:

"Oysters fattened on the English coast and submitted to the same analytical processes are found to be far less rich in iodine and bromine than those of Portugal. These latter, owing to their special constituents, represent a valuable dietary article of a nature to prevent scrofula, ganglionary gathering, rachitis and perhaps also phthisis, among classes condemned to physiological misery by the very conditions of their existence. The Portuguese oyster deserves therefore to engage the attention of medical men."

He found that 1 kilo gave 760 grams of water and ·039 gram of iodine, and ·062 gram of bromine, or iodine ·0039 per cent. and bromine ·0062 per cent. My attention was called to this report at Southport, and I took some trouble to secure a supply of genuine Anglo-Portoguese oysters. The amount of iodine found was ·00004 per cent. or 4 parts in ten millions. Whatever, therefore, may be the value of oysters in the maladies alluded to above, we may be permitted to doubt if any of these advantages are due to the iodine contained therein.

Sponge.—Spongia usta, or burnt sponge, was long used as a medicine, and was formerly official in the Dublin Pharmacopœia. According to Pereira, it was employed "as a resolvent in bronchocele and scrofulous enlargement of the lymphatic glands. Its efficacy is referable to the presence of iodine and bromine." The tests employed show that the iodine was the element required in it.

Herberger found in it, iodide of potassium, 1·16 per cent. = iodine, 0·887 per cent.; bromide of potassium, 0·702 per cent. = bromine 0·48 per cent. and traces of copper.

Preuss found, iodide of potassium, 2·14 per cent. = iodine, 1·636 per cent., and bromide of sodium, 0·76 per cent. = bromine, 0·59 per cent.

Posselt found 3·59 per cent of ash.

Cookewit found 3·7 per cent. of ash and 1·09 per cent. of iodine, also 0·50 per cent. of sulphur and 1·90 per cent. of phosphorus.

I am indebted to Mr. D. Frazer, of Glasgow, for a supply of fine sponges, and I append the results of analyses of these.

	Fine Turkish.		Honeycomb.	
Water	19·40		19·40	
Organic matter	69·39		50·24	
Ash soluble in water	2·21	Ash, 11·21	3·70	30·26
Ash insoluble in water	9·00		26·66	
	100·00		100·00	
Iodine	·200	= 4·48 lbs. to ton.	·054	= 1·2096 lbs. to ton.
Iodine on sol. salts	9·050		1·460	
Per ton of salts	202·7	lbs.	32·7	lbs.
On the total ash	0·1779	per cent.	1·7841	per cent.
Per ton of ash	4	lbs.	39·96	lbs.

The salts contained only a trace of potash, as free alkali, chloride of sodium and sulphate of lime. Turkey sponge is therefore very rich in iodine, but its value per lb. is unfortunately about twelve times that of iodine. The insoluble ash is principally sand. I hope to give some further details of this ash later on. The sponge was carbonized and the salts extracted from the charcoal. I have shown in a former paper, that the iodine is rapidly volatilized when an organic compound containing it is burnt to complete ash, especially in the presence of silica. I will only add that it will afford me much pleasure to examine any home grown sponges or other marine products that may assist our knowledge of the distribution of iodine, if any of our members who reside near the sea will favor me with samples of not less than 5,000 grams.—*Phar. Jour. and Trans.*, Sept. 20, 1884, p. 233.

Hyoscine.—Ladenburg has shown that on boiling hyoscine with alkalis or baryta, it is resolved into tropic acid and pseudotropine, a base isomeric with tropine. Both products have been further examined by A. Ladenburg and C. F. Roth (*Ber.*, 17, 151–152). *Pseudotropine* crystallizes in rhombohedrons, melts at 106°, and boils at 241–243° (tropine crystallizes in the rhombic system, and melts at 62°); it is less hygroscopic than tropine, is very readily soluble in water, readily soluble in chloroform, sparingly in ether. Proof of the identity of the tropic acid from hyoscine with that from other sources was obtained by its conversion into atropine when treated with tropine and hydrochloric acid.—*Jour. Chem. Soc.*

THE BEE-KEEPING INDUSTRY IN AMERICA.[1]

By John L. Dow.

In nothing has there been greater progress displayed throughout America during the past half-dozen years than in the keeping of bees. Formerly success in bee-keeping was attributed largely to "luck," and the variety of systems practised by different bee-keepers was only equalled by the multiplicity of designs adopted in the construction of the hives. A specialty of the American farm, as seen to-day, is its apiary, as the rows of hives are called, which are marshalled along at distances of from five to seven feet from each other in some convenient situation near the garden or orchard. And what arrests attention is the similarity of pattern in these square white painted hives. From California to Massachusetts one would think that the keepers of bees had obtained their hives from one maker. You find, however, that nearly every State has its own special make of beehives, but the differences are only in detail, and do not interfere with the general plan that seems to govern these square boxes. We eventually discover that bee-keeping in America is now everywhere reduced to principles that are as much distinguished for their certainy of operation as formerly the occupation was noted for being one essentially of guess-work.

Although bee-keeping to the extent of apiaries comprising from a dozen hives or so up to about fifty is general among the farms and orchards, the big bee ranche, whose proprietor devotes his whole attention to the industry, is also quite an established American concern. It is estimated that for the year 1882 there were 70,000 bee-keepers in the United States, possessing among them a total of 2,000,000 hives, averaging 20 lbs. of honey each, which at the low average of 10 cents per lb. represented a total of $4,000,000, besides 20,000,000 lbs. of wax, worth $6,000,000, or a total for the year's crop of $10,000,000. Of these amounts, honey and wax to the value of $1,200,000 and $700,000 respectively were exported for the same year. Among the bee-keepers in the Eastern States the work of what is called "wintering the colonies" is a very serious portion of the bee-keepers responsibility; but in the more genial and Australian-like climate prevailing along the Pacific Coast, between San Francisco and Mexico, the bee

[1] From the *Leader*. Reprinted from the *Tropical Agriculturist*, August 1, 1884.

industry is carried on under the most favorable conditions. In Los Angeles County, Southern California, there are two hundred apiaries, aggregating 12,000 hives, from which it is estimated that an average of 500,000 lbs. of honey is taken annually; and one large producer, Mr. J. S. Harbison, sent through to New York on one occasion a consignment of honey and wax amounting to ten car loads of 20,000 lbs. each, or 200,000 pounds in all. Among individual yields vouched for at Los Angeles is one where from a single hive during the season 566 lbs. of honey was taken, some of which, owing to its purity and the superior manner in which it was got up for market, reached 50 cents per lb.

The square box form of the hives that has already been alluded to, was adopted as far back as 1851, almost about the same time by the American and German bee-keepers, Langstroth and Dzeron respectively, to admit of working their movable comb improvement, an invention which has led the way to all the recent bee-keeping improvements. It is strange that the complete revolution in bee management effected by the early discoveries of these two men should only have taken place within the past few years; and it is no less notable that in 1883 the Langstroth hives are making their way all over America with little alteration in their design to those first submitted by Mr. Langstroth in 1851. Instead of the old straw hive, in which the bees were smothered previous to the honey being promiscuously tumbled out, all mixed up with larvæ, wax and broken comb, the modern hive is fitted with square frames, which can be lifted out and dropped in again at will, just as panes of glass are handled in a glazier's box. These frames are what the bees build their comb upon, and set to work at filling with "extracted" or "box" honey respectively, just as their owner may desire.

Extracted honey is that which is separated from the comb, and box honey the kind that is sold in boxes holding a pound or so of honey, and in the form that it comes from the hive. For extracted honey, full sized frames are used in the hive, but for box honey the frames are subdivided into the boxes within which the bees are to construct the honey-filled comb in the shape intended for market. When the full frames are charged with honey, another achievement in the new bee-keeping system is brought into operation, viz., the honey extractor. This is an ingenious contrivance, resembling in appearance the square frame of a street lamp, the sides of which are fitted with honey-

charged frames from the hives, and the whole then inserted within an enclosure like an oil drum, fitted with a tap. The apparatus, with its frames of honey, is fitted into pivots above and below, and is then swiftly rotated by a tooth and pinion attachment. The honey, by centrifugal force, is thus thrown from the frames, and is drawn off by the tap in the enclosing drum.

"Comb foundation" is another of the improvements. The bees, it appears, if left to themselves, not only occupy too much of the honey-making season in comb building, but also work up too much valuable material to suit the commercial notions of the modern bee manager. Honeycomb is made of pure wax, which the working bees exude from minute folds of their bodies in the shape of thin flakes or scales. It is estimated that every square inch of comb built by the bees is done at the expense of from fifteen to twenty times its weight in honey. Thus the bee-keeper resorts to comb foundation, and by saving the bee the work of making it, obtains the extra honey. A little machine with iron rollers, resembling in form the wringer in a clothes washer, is used to roll out beeswax into thin sheets of comb foundation. These are fastened on the frames, and the frames dropped into their places in the hive, when the bee proceeds at once to business.

At first, comb foundation was not a success, and it was discovered that the hitch occurred in the sheets being rolled out plain. The bees would not work because they could find no trace of cells. Then an enterprising inventor engraved his rollers, so as to stamp the sheets of beeswax with a perfect imitation of the bees' cells, when, thenceforth, the busy little insects buckled down to work with as much satisfaction as if they had made the sheets themselves. Some bee-keepers roll out their own foundation, but most obtain it from one of the many suppliers of bee-keeping requisites that are to be found all over the United States. Here is one of their advertisements:—"We are prepared to promptly fill all comb foundation orders at the following prices—one to ten lb., 55 cents per lb.; fifty lb. or over, 50 cents per lb.; 100 lb. or over, 45 cents per lb. Our largest sheets are 12 × 12 inches, and run from 5 to 8 square feet to the pound. In ordering give inside dimensions of frames. If ordered by mail add 25 cents per pound to above charges for postage and extra packing; samples by mail, post paid, 5 cents."

Another triumph of the new system is the "smoker," by which the most nervous person can handle and work among the bees with the

utmost safety. Formerly a few individuals in a locality were regarded with considerable veneration, owing to their possession of a supposed mysterious influence that prevented bees from stinging. The whole art of bee taming is now found to consist in the fact that bees will not sting when filled with honey; that to get them to fill themselves it is necessary to frighten them, and that the necessary frightening is effected by puffing a little smoke into their hives. For this purpose the smoker, which is a pointed tin funnel filled with smouldering rags and having a small bellows attached, forms one of the bee-keeper's indispensable tools of trade. The handy manner in which the bees can be inspected by puffing a little smoke into the hive, and then lifting out any section of the movable combs, enables the condition of the colonies to be constantly noted.

The first step on the part of new beginners in bee-keeping is to post themselves in the interesting study of bee physiology by obtaining one of the numerous books on the subject. The best works among American publications are:—King's "Bee-Keeper's Text-Book," Langstroth's "Bee Book," Quinby's "New Bee-Keeping," Root's "A. B. C. of Bee Culture," and Cook's "Bee-Keeper's Guide." A prosperous hive or colony of bees consists of a fertile queen, a few hnndred drones and about 40,000 workers. The queen is the prolific parent of the whole colony, and laying eggs is the sole end of her existence. In the height of the honey gathering season, and under favorable circumstances, the queen will deposit about three thousand eggs per day. She is distinguished from the other bees by being larger and having smaller wings. The drones are bulkier than the queens, but shorter, and have large wings, but are destitute of a sac for carrying honey and incapable of performing the duties of the workers. Their business is the fertilization of the queens, and as impregnation is effected while on the wing, the drones leave the hives in considerable numbers about noon on fine days, and are followed by the young queens. When the service of fertilization is supposed to be accomplished, the workers drive out the drones and keep them out till they die of starvation.

One of the many advantages of working the movable comb hive is that all excess of drone comb (which differs from the honeycomb) can be removed, and the production of useless consumers thus kept in check. The workers are the smallest in size of the three classes of bees, and, although females, are incapable of fertilization by the drones, so that, although they occasionally lay eggs, these never produce

working bees. Upon the workers devolve all the labor of building comb, collecting the honey and feeding the queen and brood. Their average age varies from a few weeks in summer to from six to nine months during the remainder of the year. The queen's average age is from three to four years, and should her death occur the workers construct large cells, supplying them with what is described as "royal jelly," so that the eggs or larvæ that otherwise would have produced worker bees are developed into queens. Only one queen is allowed to remain in each hive. The queen usually leaves the hive when about five days old to meet the drones in the air for fertilization, which, being accomplished, serves her for life, as she seldom afterwards leaves the hive, excepting in company with her first swarm.

The average time from the laying of the egg to the appearance of the perfect insect is for the queen sixteen, for the worker twenty-one, and for the drone twenty-four days respectively. The cells in which the workers are reared are the smallest in size; those for the drones nearly one-third larger, and for the queen still larger and of peculiar form, requiring as much material for their construction as fifty worker cells. In strong colonies, having plenty of stores, the queen will often deposit eggs during every month in the year, the least brood being during the three winter months. On the approach of spring an increase of brood rapidly sets in, and the bee-keepers prepare for their annual harvest of swarms and surplus honey. From three to ten queen cells are generally constructed in each hive, and in about eight days after the first queen leaves with the first swarm the next queen is ready to emerge from her cell.

An important feature in connection with the movable comb system of bee management consists in the old chance method of swarming being supplanted by what is called artificial swarming. Instead of the bees being left to swarm naturally, with the risk of being lost, the swarming is conducted at the will of the operator by the removal of the queen to a new hive, where she is followed in a most docile manner by the swarming bees. Another important advantage that the new system of bee-keeping affords consists in what is called nucleous swarming, by which a queen is reared amid a small cluster of bees in a separate hive until she matures and becomes fertilized, when the hive that is to be swarmed is shifted, and the nucleous hive put in its place. In this way the surplus bees from the shifted hive go out as usual, to their work of honey gathering, and according to the law which directs them

back to the exact spot of their old habitations, take possession of the new hive and continue their operations under the new queen that they found established there to receive them. The chief gain made by this expedient is one of time, a commodity that is of special value during the honey season.

The introduction of a fertile queen to a colony is often in this way effected a fortnight earlier than they would swarm naturally, and this in a large apiary amounts to a very considerable aggregate gain. Sometimes the facilities presented by the movable comb system are called into requisition for quite a contrary operation, viz., the prevention of swarming when an increased amount of honey may be desired instead of multiplied stocks. When this is the case the frames are lifted out until the queen is found, when one of her wings is clipped, thus preventing her from flying away, and consequently putting a stop to the swarming. In preparing for wintering the bees also it is a common practice to join two colonies, so as to get through the non-producing season upon the most economical terms; a full hive, owing to being able to maintain the proper degree of warmth, requiring less food. All such handlings as these various processes involve are enabled to be carried out under the movable comb system with the utmost certainty and exactness of operation. Further details with respect to varieties of bees, bee pasturage, and other matters, will have to be dealt with in another paper.—*Phar. Jour. and Trans*, September 27, 1884, p. 249.

Bromine as a Disinfectant.—(A. Frank, *Dingl. polpt. J.* [249], p. 167). The bromine is soaked up by infusorial earth, and is conveniently placed in a Brüner's pan of glass or porcelain, instead of lead, having a very deep depression in the cover.

The water sealing the joint of the lid becomes charged with bromine from the interior, whence the bromine gradually diffuses into the room. To accelerate the rate of diffusion, warm water may be poured into the depression in the centre of the cover.

Frank recommends petroleum to reduce the action of bromine on organic substances with which it may come into contact, or to quickly remove its odor.—*Jour. Chem. Soc.*

MILK.

By E. Duclaux.

The albuminoïd matter in milk may be divided into *colloidal caseïn*, *caseïn in suspension*, and *soluble caseïn*, the latter being capable of passing through biscuit earthenware. Small battery cells give good results, but the larger cells do not yield a filtrate of constant composition, even from the same milk, in consequence of inequalities in the earthenware. This method of filtration separates those substances which are in suspension, *i. e.*, fat, caseïn, etc., from those which are in solution, *i. e.*, sugar, inorganic salts, etc. The original milk and the filtrates were examined by the methods described in the author's memoir (*Ann. de l'Institut Agronomique*, 1879–1880). The following results were obtained with a sample of Cantal milk:

	In suspension.	In solution.
Fat	3·32	.....
Sugar	.....	4·98
Caseïn	3·31	0·84
Calcium phosphate	0·22	0·14
Inorganic salts	.....	0·39
	6·75	6·35

In this case, the soluble caseïn is about one-fifth of the total caseïn, but the proportion is rarely so high; in Cantal milk, the amount of soluble caseïn varies between 4 and 6 grams per litre; this proportion remains approximately constant, and does not sensibly change, even when the milk is kept for a considerable time. It is only slightly affected by the action of heat; the filtrate becomes turbid on boiling, but the precipitate is very slight, and gradually redissolves. The action of heat on the other two varieties of caseïn causes them to agglomerate, and the deposit inside the porous cell after filtration is always more compact if the milk has been boiled. Slight acidity causes a portion of the colloidal caseïn to pass into the suspended condition, and slight alkalinity converts some of the suspended caseïn into the colloidal form, but neither of these conditions has any effect on the soluble caseïn. The proportion of soluble caseïn in normal milk is not only approximately constant, but seems to be independent of the nature of the milk, and is sensibly the same in the milk of cows from various districts, in goats', asses', and human milk. The porportion of soluble caseïn is increased to a slight extent by the addition

of water, and to a much greater extent by the presence of the diastase to which the author has previously given the name *casease*. In one case the porportion of soluble caseïn was 0·61 per cent., but under the influence of casease it increased in 8 hours to 1·80, and in 24 hours to 2·20 per cent., after which it remained constant, one-third of the total caseïn being still in the colloidal condition. The destruction of the equilibrium thus established required a very much longer time, or the addition of a further quantity of casease. The caseïn can be more quickly converted into the soluble form by addition of some of those microbes which produce casease (*loc. cit.*), and which continually secrete this substance, whilst at the same time they use up the caseïn already existing in the soluble form for their own nourishment. The secretion of the casease is in fact the means by which these microbes prepare their own food at the expense of the suspended and colloidal caseïn and is strictly analogous to the action of the pancreatic juice in the higher animals.

Hammarsten supposed that the action of rennet on milk is to split up the caseïn into two new albuminoïds, one of which is insoluble in presence of the calcium phosphate contained in the milk, and carries down a portion of this phosphate with it, whilst the other, corresponding to lacto-proteïn, and called *whey-proteïn* by Hammarsten, remains in solution. The author treated milk with rennet free from casease, care being taken to prevent the access of bacteria as far as possible, and examined the resulting liquid by the filtration method. The result of one out of a number of experiments are given in the following table:

	In suspension.		In solution	
	Milk.	Whey.	Milk.	Whey.
Fat	4·30	0.85	.....	.....
Sugar	.....	.....	5·37	5·73
Caseïn	3·53	0·46	0·37	0.36
Calcium phosphate	0·23	.....	0·17	0.17
Inorganic salts	.....	.....	0·40	0·43
	8·06	1·31	6·31	6·69

The proportion of soluble caseïn and of dissolved calcium phosphate is the same in both the milk and the whey. The suspended calcium phosphate is however, carried down together with the fat and the caseïn in the curd. Hammarsten's supposition is, therefore, not confirmed by experiment, since the amount of soluble caseïn is not

increased, and the calcium phosphate plays no active part in the formation of the curd.

From the above table, it appears that 0·46 of the colloidal caseïn has not been converted into the solid form, and it is found that the whole of the coagulable caseïn is never precipitated, although the amount remaining in solution diminishes if the proportion of rennet is increased. Milk may be regarded as a system in which the three forms of caseïn are in equilibrium, this equilibrium being distrubed by the addition of minute quantities of inorganic salts, ferments, etc. Coagulation corresponds to the slow and regular production in a liquid mass of a state of equilibrium which requires the solidification of a dissolved substance, but there is no evidence to show why part of the caseïn should be precipitated in presence of rennet. The explanation is not to be sought in any specific properties of rennet, for other substances produce the same effect, nor in the specific properties of caseïn, since other bodies, such as oxide of iron, can exist in the same three states. Coagulation, in fact, appears to be simply a problem in molecular mechanics which cannot be solved in the present state of our knowledge.—*Compt. rend.*, 98, 438-441, *and* 526-528; *Jour. Chem. Soc.*, July, 1884, p. 762.

Determination of the value of extract of malt.—H. Tiesler, St. Petersburg, examined eight samples of malt extract by Jungk's method ("Amer. Jour. Pharm.," 1883, p. 291) for determining the diastatic value. In order to avoid the possible liquefying action upon starch of the free acid present, this was neutralized with baryta water. Five of the samples contained no diastase, the remaining three variable proportions of the same. The rapidity with which the malt extracts liquefied starch paste was estimated by means of a flat vessel having on the bottom a short thin discharge pipe through which in one minute 46·56 Ccm. of distilled water of 15° C. would run off. The mixtures of malt extract and starch were digested for a certain length of time, then rapidly cooled to 15° C. and carefully strained, when one sample discharged after one minute's action 44·57 Ccm., and after twelve hour's 45·37 Ccm., while the other sample discharged only 37·01 and 40·89 Ccm. respectively.

The author advises also the concentration of malt extract, so that it contain not less than 80 per cent. of dry matter. In dilute solutions the diastatic power is more or less rapidly decreased.—*Phar. Zeitschr. f. Russl.*, 1884, pp. 297–301.

AN IMPROVED METHOD OF PREPARING OINTMENT OF SALICYLIC ACID.

By Balmanno Squire, M.B.,

Surgeon to the British Hospital for Diseases of the Skin.

Salicylic acid ointment is now largely used, not only as a dressing to surgical wounds in the "*antiseptic*" or "*Lister*" treatment of them, but also as a local remedy in one of the commonest of the diseases of the skin, namely in eczema. Any improvement in its mode of manufacture may therefore prove a general advantage.

I find that salicylic acid is soluble in hot lard (at water-bath temperature) in about the proportion in which it is usually prescribed, that is to say at the rate of thirty grains of the acid to an ounce of lard. I mention this fact because I have before ventured in this Journal to suggest to pharmacists a systematic investigation on their part of the solubility of ointment remedies in hot lard, and on this ground, namely, that I find as a matter of my own experience that a remedy which has undergone *solution* in the lard that it is prescribed with is much more vigorous in its action on the skin or on a wound than when it has been merely *mixed* with cold lard; the ointment becomes also of better appearance, although that is a minor matter.

In the case of chrysophanic ointment, I suggested that after its preparation by solution of the acid in hot lard the ointment should, after cooling, be well mixed with the pestle and mortar on account of the tendency of the particles of the acid (minutely precipitated during the cooling of the ointment) to collect towards the surface, more especially at the edges of the surface.

I observe that the same phenomenon occurs during the cooling of salicylic ointment that I have noted in the case of chrysophanic ointment, so that the pestle and mortar are here also necessary to finish the manufacture of the ointment by the solution method.

In the treatment of any disease of the skin, the minutest possible division of any remedy employed in the state of ointment is an advantage which will promptly disclose itself to any one who may choose to experiment on the question; but in the matter of antiseptic applications to wounds, where the aim is to exclude by means of a specially composed ointment the access of infinitesimal germs, such an advantage must perhaps be of still higher value. I have never been able

thoroughly to understand why the British Pharmacopœia orders the crystals of sublimed sulphur to be used for the manufacture of sulphur ointment, in place of the much more minutely divided dust of precipitated sulphur. The former would indeed present to the eye of the acarus scabiei (but for the fact that he is destitute of eyes) the appearance of huge rocks of sulphur submerged in a sea of grease, in place of the comparatively muddy appearance of an ointment of precipitated sulphur.

It is true that in former days "precipitated sulphur" used to be largely composed of sulphate of lime, but those days are long since past and the article is now almost universally vended in a pure condition.

One of the best illustrations of my point is afforded by the assistance of the *yellow* oxide of mercury, which in other words is the precipitated as opposed to the coarse or crystalline or so called *red* oxide of mercury.

In pursuance of my preference for the minutely divided conditions of drugs, when used as ointments, I advocated, many years ago, the substitution of the precipitated or yellow oxide for the red oxide in the manufacture of oxide of mercury ointment, not only for cutaneous, but for ophthalmic use, and I read a paper on the subject before the Pharmaceutical Society, on March 8, 1865. The communication, as I admit, attracted no notice whatever in this country, but was copied a month or so afterwards into various French and German periodicals, in which I read an account of it. There equally it attracted no attention except on the part of an oculist, Professor Pagenstecher, of Wiesbaden, lately deceased. He made trial of it and struck with its advantages warmly advocated it, so that about nine months after the reading of my paper the ointment reappeared in this country as Pagenstecher's ointment, under which name it is still known and commonly employed by ophthalmic surgeons.

Mr. White Cooper, in the course of some experiments as to its effect on the diseased conjunctiva, which of course affords a more delicate test of an ointment than almost any condition of the more callous skin, found that in any given case only a much *weaker* ointment of the *precipitated* than of the crystalline (red) oxide could be tolerated. The merit of appreciating this difference so cordially as to enforce incisively a general adoption of the improvement is beyond question due to Professor Pagenstecher, whose energetic habits indeed were the cause of his death; but it is almost to be wished for, that in the compilation of

a work which is so comprehensive, and which necessarily exerts so great an influence on the therapeutics of the day, as the national Pharmacopœia, some larger constituency than two pharmacists supervised by five general physicians should be consulted.

Ointments, although an important item in a pharmacopœia, are in their details somewhat on the outskirts of general medicine; Pagenstecher's ointment, at the least, is not to be found in the British Pharmacopœia. It is used all over the world, but in the Pharmacopœia the red oxide ointment figured still as before nine years after the yellow had come into general preference and stands still so fifteen years after. Some advantage for the future certainly might be gained by the help of those who by cultivating limited departments of medicine have acquired something of a larger acquaintance than is perhaps common of particular classes of remedies; but even waiving that, the absolute exclusion of surgeons, and one may even add of obstetric practitioners, from the legislative parliament of authors of the Pharmacopœia is really quite an anomaly in the present day, as if surgeons were now-a-days armed only with knives, or obstetricians only with forceps and binders. What, it may be asked, do physicians know (officially) of the antiseptic surgical method, or of diseases of the eye, or of stone in the bladder, or of the remedies external or internal for lesions of the ear? At the risk of censure, I will imagine that their knowledge is not quite thorough; but yet the Pharmacopœia is understood on every side to be the most profound attainable exposition of all remedies that can be employed in the relief of bodily distress of any kind.—*Phar. Jour. and Trans.*, October 11, 1884, p. 281.

Influence of Salicylic acid on alcoholic fermentation.—The experiments of G. Heinzelmann (*Bied. Centr.*, 1883, 503) show that the vitality of yeast is completely destroyed by the presence of 0·15 gram of salicylic acid per 400 cc. of sugar solution, whilst the addition of 0·01 per cent. favors its greatest activity, and although the yeast plant does not propagate, nevertheless the cells developed in the presence of salicylic acid are stronger and larger than those produced in a solution free from that acid. Moreover under similar circumstances the production of alcohol in a given time is greater. The addition of 0·1 gram of salicylic acid per litre of "mashing" favors fermentation, especially with pure sugar solutions.—*Jour. Chem. Soc.*

PRACTICAL NOTES.

BY THE EDITOR.

An Antiseptic Compound called *antibacteride* is made by C. Aschmann (*Dingl. polyt. J.*, 251, p. 143) by heating 338 parts borax with 198 glucose, in the presence of a small amount of water. When the fusion is complete, 124 parts boric acid is added, whilst constantly stirring, until dissolved, and the liquor is evaporated at a gentle heat until it solidifies when run on a cold plate. The resulting mass is soft and translucent, forming an antiseptic suitable for the preservation of provisions. Its composition is represented by the formula $C_6H_{12}O_6,Na_2B_4O_7,3H_3BO_3$.—*Jour. Chem. Soc.*

Use of Boric Acid for Preserving Food.—From a series of experiments made with a view to determine the action of boric acid on the animal system, J. Forster (*Dingl. polyt. J.*, vol. 251, pp. 170–172) draws the following conclusions: The admission of boric acid as addition to food, even in very small doses, is injurious to the digestive organs. This injurious action depends on the circumstance that boric acid acts so as to materially increase the proportion of solid matters and nitrogen in the fæces separated. It is also a remarkable coincidence that the action of boric acid on the intestinal discharge is well marked, even by the exhibition of as little as 0·5 gram per diem. Moreover, this action is in direct relation to the quantity of acid taken, and is maintained for some time after the doses of acid have ceased. The action described is perceptible, not only with vegetable or animal foods, which contain a large proportion of indigestible ingredients, but also when highly digestible food, such as milk and eggs, is taken. Food to which boric acid has been added tends to cause an increase in the secretion of gall during assimilation. Its most important action, however, is the increase which it causes in the discharge of albuminous substances from the intestinal canal. From this it is evident that its use as a food preservative is not as beneficial as hitherto assumed.—*Jour. Chem. Soc.*

Belladonine.—A. Ladenburg and C. F. Roth ascertained (*Ber.*, vol. 17, pp. 152–153) that when this alkaloïd or mixture of alkaloïds is boiled with alkalis, it is decomposed into tropine and an *oxytropine*, which gives a platinochloride, $(C_8H_{15}NO_2)_2,H_2PtCl_6$, crystallizing in large red quadratic prisms, readily soluble in water; the acids formed at the same time are tropic acid, and its decomposition-products, atropic and

isatropic acids. It is therefore possible that "belladonine" is a mixture of atropine and oxyatropine, $C_{17}H_{23}NO_4$; further investigations are in progress.—*Jour. Chem. Soc.*

Detection of picric acid in iodoform.—Dr. J. Biel reports a sophistication of iodoform with picric acid, for which purpose it is adapted, owing to its yellow color, crystalline structure, melting point, solubility in alcohol and ether, and its cheaper price. On trituration in a mortar it is apt to explode. On agitating iodoform with distilled water and filtering, the filtrate should be colorless, not yellow, and on the addition of solution of potassium cyanide no change should be produced, while in the presence of a trace of picric acid, the liquid acquires within ten minutes a brown red color, due to the formation of isopurpuric acid, and subsequently a brown red precipitate of sparingly soluble potassium isopurpurate.—*Phar. Zeitschr. f. Russl.*, 1884, p. 301.

VARIETIES.

NEW ANESTHETIC MIXTURE.—Dr. Byrd, of Quincy, Ill., recommends a mixture composed of bromide of ethyl, one part (by measure), chloroform, three parts, alcohol, four parts. It must be inhaled together with a considerable quantity of air.—*Med. and Surg. Rep.*

THE USE OF CHLORAL as a remedy for obstinate singultus, or hiccough, is recommended by Dr. G. C. Kingsbury. A dose of thirty grains is said to have proved sufficient to stop a persistent hiccough with which the patient had suffered incessantly for twelve days.—*Brit. Med. Jour.*

SUBNITRATE OF BISMUTH.—Dr. J. F. Morse regards this salt an excellent surgical dressing, which produces a peculiar change in the difference of the granulations filling a wound, and in the secretions which escape from the wound, providing it be a fresh one.—*Western Lancet.*

THE COMPATIBILITY OF SULPHATE OF QUININE AND IODIDE OF POTASSIUM.—It having been suggested that when these drugs are prescribed together, or one a short time after the other, owing to their incompatibility, that they will produce anorexia, nausea, even vomiting, or colic. William Martindale writes to the "Brit. Med. Jour.," July 5, 1884, that such a mixture, with the addition of compound powder of tragacanth, is a favorite with a physician in large practice, yet he never heard any complaint about its effect. Chemically, their incompatibility will depend upon whether the normal sulphate of quinine is dissolved by diluted sulphuric acid added to the mixture or not. No decomposition will occur if the two neutral salts be mixed with water in a fairly diluted condition; in an ordinary dose,

some quinine will remain undissolved, as sulphate of quinine. But if diluted sulphuric acid be used to dissolve the sulphate of quinine, the mixture is at first clear; but, on standing, it deposits a reddish-brown powder. Theoretically, this is due to the sulphuric acid reacting on the iodide of potassium, setting free hydriodic acid, which is colorless, but readily decomposes, liberating iodine; and this element, under certain conditions, has a great affinity for sulphate of quinine, forming sulphate of iodo-quinine. The reddish-brown powder which he has mentioned as depositing in the above mixture is not pure sulphate iodo-quinine. It has been analyzed by Righini (Watt's Dictionary, vol. v, p. 20), and shown to be a mixture of hydriodate of quinine and iodo-quinine.—*Med. and Surg. Rep.*, Aug. 2.

MINUTES OF THE COLLEGE.

PHILADELPHIA, September 29, 1884.

The semi-annual meeting of the Philadelphia College of Pharmacy was held this day at the hall of the College, No. 145 North Tenth street.

Dillwyn Parrish, President, occupied the chair, and fifteen members were in attendance.

The minutes of the quarterly meeting held in June last were read, and, on motion adopted.

The minutes of the Board of Trustees since that time were read by Wm. C. Bakes, Secretary of the Board, and, on motion, approved.

Alonzo Robbins, Chairman of the Delegation appointed to attend the annual meeting of the American Pharmaceutical Association, made the following report, which was accepted, and ordered to be embodied in the minutes:

To the Philadelphia College of Pharmacy:

The undersigned, Chairman of the Delegation elected to attend the meeting of the American Pharmaceutical Association at Milwaukee, Wisconsin, respectfully reports as follows:

Due, no doubt, to the fact that the place selected was so far from the locality in which the Association has its greatest membership, the meeting was not as largely attended as usual.

The sessions were held in Turner Hall, which was well adapted for the purpose, except that some annoyance was unavoidably caused by the exhibition being in a room immediately over the meeting room.

Over twenty original papers were read, most of them being quite interesting, and, perhaps, a larger proportion than usual showing evidence of careful investigation, and giving promise of much practical and scientific value. In this connection it may be well to state that, owing to the increasing difficulty of getting members to accept queries, it is very desirable that the various State Pharmaceutical Associations should, in some way, become contributors to this important work of the National Association.

It is a source of regret that in the matter of an increase of membership this meeting was not a success, there being only about forty new members

obtained, while nearly eighty are liable to be dropped from the roll. Considering the evident prosperity of pharmacists in the Northwestern States, it is surprising that so few could be induced to join the Association.

Mr. John Ingalls, of Macon, Ga., was elected President for the ensuing year. Pittsburgh, Pa., and the second Tuesday of September, 1885, were selected as the place and time for holding the next annual meeting.

Previous to the meeting of the American Pharmaceutical Association, the annual meeting of the National Retail Druggists' Association was held. The great interest manifested in this meeting no doubt contributed to draw many to Milwaukee who otherwise would not have attended. This Association, organized only a year ago, now numbers over 2,500 members.

The evenings during our stay in Milwaukee were devoted to various pleasant social entertainments; one afternoon was given to a carriage ride around the city, and on Friday afternoon a very pleasant excursion on Lake Michigan took place.

During Friday afternoon and evening quite a large party started for Kilbourne City, from which place a trip was made by steamboat up the Wisconsin river through the Dells, returning to Kilbourn by row-boats. The Dells, or as originally termed, the Dalles of the Wisconsin river, extend from about four miles above, to about two miles below Kilbourn City, and consist of a deep passage cut by the river through the soft sand-rock, with numerous openings called gulches, canyons, etc., some of which extend a mile or two back from the stream.

From Kilbourn a number started homeward, but the majority of the party continued on to Minneapolis and St. Paul.

Respectfully submitted,

September 29, 1884. ALONZO ROBBINS, *Chairman.*

Professor Remington, on behalf of the Committee on Deceased Members, alluded to the death of our fellow member, Ambrose Smith, but stated that in consequence of the shortness of time since his death, the Committee had not been able to get the important facts concerning his life together for a memorial notice. He hoped, however, that the Committee would be able to make a report at the next stated meeting of the College.

Charles Bullock, alluded to the deceased in fitting terms, and spoke of his usefulness in the College for many years; acting as Treasurer, and otherwise serving its interests.

The President ordered an election for three Trustees, and a Committee on Deceased Members, this being the time for such action, and appointed Messrs. Evan T. Ellis and Edward C. Jones tellers, who, upon a ballot, reported the following gentlemen elected:

Trustees for three years, term ending September, 1887.—Messrs. Albert P. Brown, William B. Thompson, Henry Trimble.

Committee on Deceased Members.—Messrs. Charles Bullock, Alfred B. Taylor, Gustavus Pile.

Then, on motion, adjourned.

WILLIAM J. JENKS, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 21, 1884.

The first of the series of Pharmaceutical meetings of this season was held this day.

Mr. Alonzo Robbins was called to preside.

Dr. A. W. Miller presented to the College, on behalf of Mr. Alfred Speer, specimens of American wines made at Passaic Falls, N. J., by the donor, who claims absolute purity for them; also specimens of Dundas Dick & Co.'s Menthol cones.

Professor Maisch presented Vol. V of the Index Catalogue of the Library of the Surgeon General's Office; also from Prof. Herrera a copy of Nueva Farmacopea Mexicana de la Sociedad Farmaceutica de Mexico, segunda edicion; also on behalf of Dr. F. L. Slocum, a copy of Dr. D. Gorter's work on Materies Medicæ, published in 1740; a copy of the Code pharmaceutique, à l'usage des hospices civils, etc., par A. A. Parmentier, published in 1803, and one of the Pharmacopœa Pauperum in usum instituti clinici Hamburgensis, published in 1804; also a copy of Bloxam's Chemistry, one of Wurtz's Elements of Chemistry, and one of Lloyd's Chemistry of Medicines, and a reprint of the first Pharmacopœia published in the United States, the latter from the publishing committee; also Proceedings of the American Pharmaceutical Association, 1883. Four volumes of the Patent Office Reports and a copy of the Report of Herndon and Gibbon's Exploration of the Valley of the Amazon, made by order of Congress in the years 1852–'53, were received from the Actuary, and the thanks of the meeting were returned to the various donors.

A specimen of Virgin Scammony was received from Mr. Henry N. Rittenhouse, by whom it had been imported.

Mr. C. Fred Zeller, the Curator of the Cabinet, presented a specimen of the flowers from which Dalmatian insect powder is obtained; this specimen of Pyrethrum cinerariæfolium was grown in California.

Dr. L. Wolff read a paper upon the propriety of the apothecary preparing his own fluid and solid extracts and showed two forms of apparatus for the recovery of the alcohol or other volatile liquids which might be used in such preparations; the paper was referred to the Publication Committee. Professor Maisch expressed the opinion that papers of this kind were very important, and should induce the apothecaries to prepare their own pharmaceuticals and very many of their chemicals, as they were educating themselves and their apprentices as well as offering medicinal agents the qualities of which they were sure were of the proper standard.

Dr. Wolff inquired if any of the members present had any experience with the alkaloid obtained from Erythroxylon Coca, which has been recommended lately as an anæsthetic in ophthalmic practice. Professor Maisch stated that he had experimented somewhat with Coca in 1861, isolated the cocäine and determined the existence of a second alkaloid which had since

been more fully investigated; since that time he had not experimented with the alkaloids.

It was queried whether the use of *chloral hydrate* was incompatible with *calomel*. Dr. Wolff thought that there was no apparent reason for considering the two chemicals as being incompatible. Professor Maisch concurred in this, but suggested that as chloral hydrate was so readily decomposed under various circumstances, the chlorinated decomposition products might determine the formation of some soluble compound of mercury, possibly corrosive sublimate; the subject was deserving of investigation.

There being no further business, a motion to adjourn was carried.

T. S. WIEGAND, *Registrar.*

ALUMNI ASSOCIATION, PHILADELPHIA COLLEGE OF PHARMACY.

The first social meeting, held October 14, was well attended, L. E. Sayre, Ph.G., occupying the chair. Dr. Carl Seiler gave an interesting and instructive lecture on "Hay Fever and its Treatment," illustrating his remarks by diagrams, models and apparatus, among the latter being one used for the destruction of what the lecturer termed the "hay fever spots" by means of a platinum wire heated with a galvanic battery. The palliative effect of the Turkish bath was likewise explained.

Dr. Miller stated that a nostrum sold as a catarrh cure consisted almost wholly of sodium bicarbonate.

The remaining time was occupied with recitations by Miss F. L. Pierce, principal of the Mount Vernon Institute of Elocution, and Miss L. Lorenz, with the reading of reports, examination of specimens and discussions.

EDITORIAL DEPARTMENT.

HOMES FOR COLLEGES OF PHARMACY.—We are pleased to note the fact that to those colleges which have heretofore secured buildings for their sole use, two have been added during the past month, those of St. Louis and Chicago. The new buildings, we understand, are well supplied with lecture rooms, laboratories and other conveniences. The faculty of the St. Louis College remains unchanged; the Chicago College has secured the efficient services of Professor Oscar Oldberg, who in addition to his lectures, has also the laboratory work in charge.

While it is gratifying to observe the steady progress made in pharmaceutical education in this country, it is to be hoped that in the near future also those institutions may secure permanent homes of their own, who as yet have not procured them.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The National Dispensatory Containing the Natural History, Chemistry, Pharmacy, Action and Uses of Medicines, etc. By Alfred Stillé, M.D., LL.D., and John M. Maisch, Phar.D. Third edition, thoroughly revised, with numerous additions. With 311 illustrations. Philadelphia: Henry C. Lea's Son & Co., 1884. Large 8vo, pp. 1755. Price in cloth, $7.25; in leather, $8.00.

The authors have endeavored to make this third edition of the National Dispensatory complete, interesting and instructive; the book is the very Encyclopædia of Pharmacy and nothing has been left undone to reach this end. The origin of drugs, their nature, properties, constituents and composition are fully described, their adulterations and impurities are mentioned, and their physiological effect based on experiments with animals, and therapeutical effect as elicited by clinical experience are explained. Their administration in Pharmacy and Medicine, with the doses, are minutely given.

Besides the new drugs and new officinal preparations of the Pharmacopœia of 1880, a great many, as yet unofficinal, have been added. While in the former editions, besides the U. S. preparations, mainly those of the British Pharmacopœia were mentioned, this edition contains also the compounds and preparations of the latest German Pharmacopœia and a great many of the French Codex, thus giving the book the character of a pharmaceutical Dictionary.

The arrangement is in the main part the same as in the former editions. All the new drugs and preparations taken up in the Pharmacopœia of 1880 are conspicuously inserted, carefully described and commented. To conform with the requirements of the Pharmacopœia several changes had to be made, particularly in the nomenclature and in the headings of different articles. So we find Filix mas under Aspidium, Gamboge under Cambogia; Spir. Lavandulæ comp. is called Tinct. Lav. comp, and Pilulæ ferri carbonatis and Pil. Hydrargyri are mentioned under Massa ferri carb. and Massa hydrargyri. Some of the headings of drugs are more condensed: Chrysophanic acid and Araroba are to be found under Chrysarobin, the former also under Rheum; older inmates of Materia Medica from the mineral and animal kingdom, whose chief constituent is Carbonate of Calcium, as Corallia, Testæ ovorum and Conchæ præparatæ are enumerated under Creta præparata, and the different Starches and Arrowroots are all found under the heading of Amylum, where the granules of each kind are illustrated. Many more of such instances could be mentioned, but suffice it to say that we consider these condensations as very instructive and beneficial to the student of Pharmacy, inasmuch as he becomes better impressed with the relation of the different substances. The General Index is so complete that everything is easily found in the book.

Some of the preparations and salts which have in later years become of more importance in Medicine are made more conspicuous under separate headings, while others, and also numerous raw drugs, are enumerated under "Allied Drugs and Preparations," which are made conspicuous by smaller type and closer printing.

Illustrations are given of the forms of crystals of the more important

Salts, and numerous wood-cuts are added of the anatomical structure of different barks and roots.

Of the many additions of unofficinal drugs and preparations we mention particularly Thymol, Resorcin, Kairine, Quebracho and sundry Cadmium and Nickel Salts.

To facilitate the use of the formulas of the Pharmacopœia, which are expressed therein in parts by weight, they are also given in definite weights and measures.

As Commentary of the Pharmacopœia this edition is of superior value. Under the heading "Extracta and Extracta fluida" the process for preparing these important preparations in pharmacy is minutely described and the process as practiced in other countries, critically commented; for the preparation of fluid extracts by means of percolation directions are given for the manipulation of each part of the operation and every particular so lucidly explained that every pharmacist by carefully observing the instructions, must be able to make these so very important preparations himself.

As the revisers of the Pharmaçopœia did not see fit to give in the Pharmacopœia formulas for preparing certain chemicals, formulas for preparing these are also left out in this edition; the authors made up this deficiency by explaining the process by which this or that article is obtained. This is certainly much better and more instructive as pharmacists will hardly ever undertake to make Quinine or Strychnine, Corrosive Sublimate or other such chemicals

The articles on Cinchona and Opium and their products comprise everything that investigation and science have elucidated up to the present time, not only in regard to pharmacy but also to therapeutics.

Of great importance are the tests and assays for ascertaining the purity, strength and relative value of a great many substances.

Under tests we not only understand the physical properties which characterize the pure substance but also the chemical relation to other substances. The tests mentioned in the book to prove the identity of the substance and also to give the absence of any impurities are selected with great care and conform to the latest researches in chemistry and pharmacy. Tests of the British and German Pharmacopœias are mentioned for comparison.

The assays given under Cinchona, Opium and other valuable drugs, to ascertain their true value are of great importance, and every conscientious pharmacist ought to find delight in making use of them for his own satisfaction.

The list of volumetric solutions, as adopted by the Pharmacopœias, for ascertaining the purity of certain chemicals and the relative strength of others, must not be undervalued.

The paragraphs on the physiological action and medical uses of Drugs and Medicines we found largely augmented, particularly so with Carbolic acid, Salicylic acid, Jaborandi and others, and those substances which in later years have been recommended and experimented with for anæsthetic effects are very exhaustively treated upon.

The largely increased Index of Therapeutics is a further proof of the care which the authors have bestowed on this third edition.

The typography of the work leaves nothing to be desired.

The authors certainly deserve the fullest acknowledgments for their arduous labors and are entitled to the sincere thanks of the pharmaceutical and medical professions.

E. SCHEFFER.

LOUISVILLE, September, 1884.

Materia Medica and Therapeutics, an introduction to the rational treatment of disease. By J. Mitchell Bruce, M. A., M. D., etc. Philadelphia: Henry C. Lea's Son & Co. 1884. 12mo., pp. 547.

The scope of this work is therapeutical as indicated by the title. In the introduction the various pharmaceutical preparations and processes are briefly defined and explained; also the art of prescribing and the administration of drugs. The materia medica is divided into two parts, entitled inorganic and organic materia medica. These titles are not entirely correct, inasmuch as the first part contains not only the inorganic compounds of the metallic and non-metallic elements, but also a number of carbon compounds, which are usually denominated organic. This group is termed the "carbohydrates and other carbon compounds," though not a single carbohydrate is here considered, although their derivates like alcohol, etc., have found a place under this heading. Nitrous oxide has been placed in this group (p. 153) for no other obvious reason, except that it is conveniently considered with ether and the various chlorine and bromine compounds possessing anæsthetic properties. On the other hand a number of definite chemical compounds like tannin, gallic acid, santonin and the vegetable alkaloids are treated of in connection with the drugs from which they are usually prepared; this is likewise the case with such products like fats, volatile oils, resins, and the carbohydrates gum, starch, sugar and milk-sugar.

The organic materia medica is divided into two groups according to the origin of the drugs from plants or animals, both groups being arrangad according to the natural system. The drugs comprise those of the British Pharmacopœia, together with a number of more or less important ones, which are not recognized by this authority, a number of the latter being of American origin. A few of the vegetable drugs have been assigned a wrong position, like Podophyllum (p. 178) which has been placed among the Ranunculaceæ, while botanists now refer it to the Berberidaceæ; and Cimicifuga (p. 179) which has been referred to the Magnoliaceæ, but properly belongs to the Ranunculaceæ. The drugs are briefly defined according to the botanical name, part and habitat of the plant; a brief description, the composition and dose are given, and then in accordance with the plan of the work, more in detail, their action and uses. The descriptions are usually those given by the British Pharmacopœia; unofficinal drugs are described in a similar brief, but generally more vague manner, the description being, in some cases, positively wrong. Thus Spigelia is said to be "a thick globular brown head, with numerous fine branching rootlets" (p. 291). In some cases the terminology is wrong or at least inconsistent; thus duboisia (p. 307) is defined to be an alkaloid from Duboisia myoporoides, but on p. 388 it is given as the plant; leaves would be better. Similar

errors have crept into the tables on pages 386 and 387, where the different drugs are enumerated according to the parts of plants they represent. Kamala is said to be the fruit and the berry; Dulcamara the whole plant and the tops; Meatha piperita and M. viridis the flowers or buds, etc., and a distinction between fats and volatile oils is not made.

We have chiefly dwelt upon the descriptive portion of materia medica, which though in the main correct, is in need of careful revision. That portion referring to therapeutics, we believe to be free from inconsistencies, but we must leave this to the judgment of physicians. The third part of the book on general therapeutics comprises about 150 pages and discusses the action and uses of remedies under the headings of the physiological systems of the body, like digestion, circulation, respiration, etc. The compactness of the work and its fulness we think, will render it valuable to the medical student.

American Medicinal Plants; an illustrated and descriptive guide to the American plants used as homœopathic remedies, their history, preparation, chemistry and physiological effects. By Charles F. Millspaugh, M.D. New York and Philadelphia: Boericke & Tafel. No. 1–5. Price, $5.

The first part of this work was issued in 1882; but the publishers have deemed it better to issue it in fascicles of five parts, containing 30 plates, with the necessary text. We have commented on the first part in this JOURNAL, 1882, p. 478, and are pleased to say that the improvements which we then considered necessary have been made, so that now it merely remains to state that two such fascicles will be published each year, and that probably within two years the work containing 100 illustrations, will be completed. To judge from the present fascicle the work will not be confined to plants indigenous to North America, but will also contain those which have become naturalized like Berberis vulgaris, Melilotus officinalis, Chelidonium majus and others.

The Elements of Physiological and Pathological Chemistry. A hand-book for medical students and practitioners; containing a general account of nutrition, foods and digestion, and the chemistry of the tissues, organs, secretions and excretions of the body in health and in disease; together with the methods for preparing or separating their chief constituents as also for their examination in detail, and an outline syllabus of a practical course of instruction for students. By T. Cranstoun Charles, M.D., F.C.S., etc. Illustrated with 38 engravings on wood and a chromo lithograph. Philadelphia: Henry C. Lea's Son & Co., 1884. 8vo. pp. 463. Price $3.50.

With the exception of urinalysis, this branch of applied chemistry is not nearly as extensively cultivated as its importance requires, and even the special application referred to is frequently resorted to merely for the purpose of determining qualitatively the presence or absence of one or two normal or morbid constituents. With the extension of the field of chemistry to the continuously occurring changes within the living body, and with the improvements in methods and apparatus suggested by close observation of apparently insignificant distinctions in the properties of products, the number of distinct principles, wholly or partly isolated from vegetable

and animal bodies, has been materially augmented of late years, and greater precision has been secured for distinguishing them. In order to study these intelligently the student should possess a th rough knowledge of the elements of general chemistry, and practical acquaintance with analytical work. Thus prepared he will be enabled to profitably pursue the course of experimental work which the author has mapped out in the book with continual references to the subject matter treated of elsewhere.

The work is divided into four parts, the first treating of nutrition and foods. It opens with brief descriptions of apparatus, reagents and processes, and then considers nutrition and the various classes of foods. The second part is devoted to digestion and the secretions concerned therein, comprising the saliva, gastric, pancreatic and intestinal juices and bile. The third part discusses the tissues and remaining secretions, including blood and its constituents with derivatives, milk, the various organs, etc.; and the fourth part relates to the excreta, fæces and urine, the latter being treated with considerable detail, on account of its importance from a physiological and pathological point of view; about one fourth of the book is devoted to the normal and abnormal constituents of urine and to its analysis.

In the foregoing we have given merely the roughest outline of the contents of the work. We cannot enter into details, and merely state here that the descriptions are clear and the leading characters judiciously put forth. Everywhere the evidence is apparent that the author not only knows what he is writing about, but also has consulted the literature of the subjects. Primarily intended for the use of the medical student and the physician, the work is nevertheless almost entirely an important one for the progressive pharmacist, who is acquainted with or desires further information on the analysis of urine, calculi, milk, blood and other animal substances. The illustrations of apparatus, crystalline deposits and of microscopical drawings are good, and the plate giving the absorption spectra of six derivatives of blood has been handsomely executed.

Manual of Chemistry. A guide to lectures and laboratory work for beginners in chemistry; a text-book, specially adapted for students of pharmacy and medicine. By W. Simon, Ph.D., M.D., Professor of Chemistry and Toxicology in the College of Physicians and Surgeons, and Professor of Chemistry and Analytical Chemistry in the Maryland College of Pharmacy, Baltimore. With 16 illustrations on wood and 7 colored plates. Philadelphia: Henry C. Lea's Son & Co. 1884. 8vo, pp. 411.

Elementary works on chemistry are so numerous that a new one would seem to be superfluous; but the one now before us has been written with such good judgment of the needs of those for whom it is intended, that it will be appreciated. Being intended merely for a guide to learners, not as a work of reference, many details have purposely been omitted which would be looked for in larger works. A frame-work is thus presented which gives the fundamental principles and characters of chemistry and chemical compounds, and thus aids the attentive student in completing the structure. That the want of pharmaceutical and medical students has

been specially considered is also evidenced by restricting the consideration of the elements and their compounds to those which are of medicinal use, or which are of importance, theoretically or practically, in the various chemical processes or as constituents of important products of nature. At the same time the work is comprehensive and embraces nearly the whole field of chemistry in its application to pharmacy and medicine.

The work is divided into seven parts, treating of chemical physics, principles of chemistry, non-metals, metals, qualitative analysis, carbon-compounds and physiological chemistry, the latter including the testing of milk, urine, etc. A welcome feature for the beginner are the 56 illustrations upon seven plates, showing the exact color or change of colors of characteristic chemical reactions; they have been very faithfully executed, and represent a very large amount of well directed labor.

Also in all other respects the book is not only presentable, but good, and will be found useful and instructive.

Addenda to Drugs and Medicines of North America. By J. U. and C. G. Lloyd. Cincinnati.

The quarterly publication by the same authors which we have noticed on page 346 of the June number of the JOURNAL, and of which now three parts have appeared, not only continues in the path lined out for it in the first part, but the following ones have been made even more interesting and valuable by the histological decriptions and the maps showing the distribution of the plants under consideration. The periodical now before us, is intended to supplement the former, by noting information which may have come to light after publication in the first periodical, and to collate notes on the medical properties of American plants in local use. The "Addenda" will be issued at least four times a year, at the low price of 25 cents.

The Physician's Visiting List for 1885. Philadelphia: P. Blakiston, Son & Co.

This is the thirty-fourth year of the publication of this visiting list, which may be obtained arranged for from 25 to 100 patients weekly, the larger ones bound either in one or two volumes. Interleaved lists are likewise furnished.

Sur la recherche de très petites quantités de sucre dans l'urine. Par le Dr. C. Méhu, pharmacien à l'hôpital de la charité.

On the detection of very small quantities of sugar in urine.

Reprint from "Annales des maladies des organes génito-urinaires," August, 1884.

Pharmaceutical Education in the United States. By Prof. Oscar Oldberg, Chicago, Ill.

A fair exposition of the educational courses adopted by Colleges of Pharmacy, with suggestions by the author.